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EXAMINER	
RU, POWEN	
ART UNIT	**PAPER NUMBER**
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/797,317	Applicant(s) KARINIEMI, ROBERT	
	Examiner Powen Ru	Art Unit 2615	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 March 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *20051013*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

This is the initial office action based on the application filed on 3/10/2004. Claims 1-33 are currently pending and have been considered below.

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because:

- reference character "402" has been used to designate both "blocking module" (page 8 line 19) and "substitution module" (page 8 line 24 and page 10 line 7).
- reference character "403" has been used to designate both "data signal trigger" (page 8 lines 23-30) and "substitution module" (page 9 lines 12-17).
- reference character "416" has been used to designate all "external source of data" (page 9 line 1), "data source" (page 9 line 2), and "external transceiver" (page 9 line 4).
- reference character "438" has been used to designate both "waveform memory" (page 10 lines 14-30 and page 11 line 1) and "memory waveform" (page 10 lines 18).
- The applicant is reminded to check for other inconsistent terms.

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: 425 and 426 (Fig. 4). The examiner considers the timer (possible 425, page

9 line 16) and another signal input means (possible 426, page 9 line 19) are the intended components.

3. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-2, 4, 6, 12, 15, and 20-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Julstrom et al. (2003/0044033).

Claim 1: Julstrom et al. (Fig. 1 is an overall hearing improve system [0038-40]; Fig. 2 is a more specific embodiment [0041-0042]; and Fig. 16 is the transmission detection and switch system [0078-0080]) discloses a method to block data transmission interference (completely shut off microphone 207 [0040], thus the noise due to wireless transmission will not pass through) from the input of a receiver (speaker 208 [0042], Fig. 2) in a hearing instrument (e.g., hearing aid 203 [0041]), comprising: receiving an acoustic-based signal representative (signal between microphone 207 and circuit 212 in Fig. 2, or more specifically, audio output signal 1637 [0080] in Fig. 16) of sound received at a microphone system (signal received by microphone 207 [0042], Fig. 2); determining if a trigger (determines from detector input signal 1629 [0079-0080], Fig. 16) associated with a data transmission (that input signal 1627 represents a desired transmission [0079], Fig. 16) has occurred; presenting a signal representative of the acoustic-based signal (provides audio output signal 1637 as signal 1635 [0080], Fig. 16) to the input of the receiver when the trigger has not occurred (if input signal 1627 is not representative of a desired signal [0080]) such that the receiver converts the acoustic-based signal into an output acoustic signal (speaker 208 converts selected signal into audio [0042], Fig. 2); and blocking the signal representative of the acoustic-based signal from the input of the receiver (as the electronic switch 1625 selects another audio output 1631 [0079], Fig. 16, the audio output 1637 from the microphone 207 is blocked from the speaker 208, Fig. 2) when the trigger has occurred (if input signal 1627 represents a desired transmission [0079]) such that data transmission interference is blocked from being converted into the output acoustic signal.

Claim 2 and 4: Julstrom et al. discloses a method as in Claim 1; and further discloses a step of generating the trigger (receiver 1621 generates a detector input signal 1629 [0078], Fig. 16) associated with the wireless transmission when a wireless transmission carrier has been sensed (upon receipt of the input signal 1627 [0078]; more specifically, the receiver is a PWM wireless type receiver 1973 [0085], in Fig. 19, with output 1981 representing an un-demodulated carrier signal [0086]). The trigger is present for at least a portion of the wireless transmission duration (according to Fig. 19, the output 1981 of the PWM wireless type receiver 1973 [0086] stays active when the transmission is present).

Claim 6: Julstrom et al. discloses a method as in Claim 1; and further discloses a step of presenting (electronic switch 1625 selects audio output 1631 [0079], Fig. 16) a signal representative of a substitute waveform (representative of the signal 1627 from the secondary audio source) to the input of the receiver (as signal 1635) when the trigger has occurred (if input signal 1627 represents a desired transmission).

Claim 12: Julstrom et al. discloses a hearing instrument (e.g., hearing aid 203 [0041], Fig. 2), comprising: a data receiver (209 [0042]) to receive a data transmission (receiving wireless signals [0042]); a microphone (207 [0041-0042]) system to receive an input acoustic signal (signal received by microphone 207 [0042]) and generate an acoustic-based signal (audio output signal 1637 from primary audio source [0080], Fig. 16); a hearing instrument receiver (speaker 208 [0042], Fig. 2) to receive and convert a processed signal representative of the acoustic-based signal into an output acoustic signal (converts the selected signal into audio [0042], see details in [0079-0080]); and

means (circuitry 212 that performs detecting, selecting, and combining functionality [0042] in Fig. 2, or more specifically, transmission detector 1623 and electronic switch 1625 [0078] in Fig. 16) to block (as the electronic switch 1625 selects another audio output 1631 [0079], Fig. 16, the audio output 1637 from the microphone 207 is blocked from the speaker 208, Fig. 2) the signal representative of the acoustic-based signal for at least a portion of a time period (according to Fig. 19, the output 1981 of the PWM wireless type receiver 1973 [0086] stays active when the transmission is present) when the data receiver receives a data transmission (if input signal 1627 represents a desired transmission [0079]) such that the output acoustic signal does not include noise attributed to the data transmission (as the microphone is completely shut off [0040], the noise due to wireless transmission will not pass through).

Claim 15: Julstrom et al. discloses a hearing instrument (e.g., hearing aid 203 [0041], Fig. 2), comprising: a data receiver (209 [0042]) to receive a data transmission (receiving wireless signals [0042]); a microphone (207 [0041-0042]) system to receive an input acoustic signal (signal received by microphone 207 [0042]) and generate an acoustic-based signal (audio output signal 1637 from primary audio source [0080], Fig. 16); a switch (electronic switch 1625 [0078]) having a first input (audio output 1637 [0080]) and an output (signal 1635 [0080]), the switch being configured to selectively connect the first input to the output (by means of switch 1625 [0080]); a first signal path (indicated by 1637, Fig. 16) to carry a signal representative of the acoustic-based signal (audio output 1637 [0080]) from the microphone system to the first input of the switch; a hearing instrument receiver (speaker 208 [0042], Fig. 2) to convert an output signal from

the output of the switch into an output acoustic signal (converts selected signal into audio [0042]); and a controller (transmission detector 1623 [0078], Fig. 16) to receive a trigger signal (receives detector input signal 1629 [0078]) indicative of a data transmission occurrence (that input signal 1627 represents a desired transmission [0079]), and to communicate (generate in response a control signal 1633 for the electronic switch 1625 [0078]) with the switch to selectively disconnect the first input from the output (select audio output 1631 from secondary audio source [0040], thus disconnect from the primary audio source) during at least a portion of the data transmission occurrence (if input signal 1627 represents a desired transmission [0079]) such that interference associated with the data transmission occurrence is not transferred (as the microphone is completely shut off [0040], the noise due to wireless transmission will not pass through) to the hearing instrument receiver.

Claim 20: Julstrom et al. discloses a hearing instrument as in Claim 15; and further discloses that at least one of the switch and the controller is implemented using software (digital signal processing may also be used to carry out such functionality [0089]).

Claim 21: Julstrom et al. discloses a hearing instrument as in Claim 15; and further discloses that at least one of the switch and the controller is implemented using hardware (numerous circuit embodiment may be implemented to carry out the general functionality [0089]).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 22 and 32-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Julstrom et al. (2003/0044033).

Claim 22: Julstrom et al. discloses a hearing instrument (e.g., hearing aid 203 [0041], Fig. 2), comprising: a controller (transmission detector 1623 [0078], Fig. 16) to receive the data signal (detection input signal 1629) and store programming instructions for the hearing instrument in a program memory module (inherently, when implemented using DSP [0089]); a trigger generator (part of receiver 1621 [0078]) to send a trigger signal (generate a detection input signal 1629) to the controller, the trigger signal corresponding to a wireless data transmission occurrence (upon receipt of the input signal 1627 [0078]; more specifically, the trigger generator is part of a PWM wireless type receiver 1973 [0085] in Fig. 19); a microphone (207 [0041-0042], Fig. 2) system to receive an acoustic signal (signal received by the microphone 207 [0042]) and covert the acoustic signal into an analog acoustic-based signal (audio output signal 1637 from the primary audio source, e.g. a hearing aid microphone [0080], Fig. 16); an analog-to-digital converter (inherently, when implemented using DSP [0089]) to convert the analog acoustic-based signal into a digital acoustic-based signal (digital version of audio output signal 1637); a digital signal processing module (circuitry 212, again, that performs detecting, selecting, and combining functionality [0042], in Fig. 2, including a

transmission detector 1623 and an electronic switch 1625 [0078], in Fig. 16, when implemented using DSP [0089]) to transform the digital acoustic-based signal into a processed acoustic-based signal (selected signal or combined signal [0042]); a blocking module (electronic switch 1625 [0078-0080], Fig. 16) to selectively block the processed acoustic-based signal from passing as a digital output signal (as the electronic switch 1625 selects another audio output 1631 [0079], Fig. 16, the audio output 1637 from the microphone 207 is blocked from the speaker 208, Fig. 2), wherein in response to the trigger signal (determine from the detector input signal 1629 [0079]), the controller operates to selectively block (generate a control signal 1633 for the electronic switch 1625 to select another audio output 1631 from the secondary audio source) the processed acoustic-based signal from passing as the digital output signal (digital version of signal 1635 [0079-0080]); a digital-to-analog converter (inherently, when implemented using DSP [0089]) to convert the digital output signal into an analog output signal (signal 1635); and a receiver (speaker 208 [0042], Fig. 2) to convert the analog output signal into an acoustic signal (audio output 117 [0039], Fig. 1); but does not specifically disclose a wireless transceiver residing in the same unit as other components. However, Julstrom et al. further discloses a wireless transceiver (e.g., 311 within the system 301 [0050-0051], Fig. 3) to receive a wireless data transmission (receiver 313 ... receives the signal via aerial 339 [0051]) and convert the wireless data transmission into a data signal (to signal combiner circuitry 317 [0051]). The examiner notes that the data receiver (209 [0042] which resides in the same unit as other components, see Fig. 2) is actually capable of performing the claimed intended use of

said wireless transceiver. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use either a transceiver or a receiver to receive a wireless data transmission and convert the wireless data transmission into a data signal. As Julstrom et al. teaches that the transceiver provide bi-directional communication (as described in [0051]) which enables various applications (as summarized in [0007]), one would have been motivated to place the transceiver in the same unit as other components to offer more communication options.

Claim 32: Julstrom et al. discloses a hearing instrument as in Claim 22; and further discloses that the trigger signal corresponds to at least a portion of a time period (according to Fig. 19, the output 1981 of the PWM wireless type receiver 1973 [0086] stays active when the transmission is present) associated with the wireless data transmission.

Claim 33: Julstrom et al. discloses a hearing instrument as in Claim 22; and further discloses a carrier sense module (part of receiver 1621 [0078] in Fig. 16, more specifically, a PWM wireless type receiver 1973 [0085] in Fig. 19) to sense a carrier (the input derived from "T"-coil L2 1979 [0086]) associated with the wireless data transmission, wherein the trigger signal corresponds a sensed carrier (output 1981 represents an un-demodulated carrier signal [0086]).

8. Claims 3 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Julstrom et al. (2003/0044033) in view of Baechler (6,768,802).

Claim 3: Julstrom et al. disclose a method as in Claim 1; but does not specifically disclose in anticipation of the wireless transmission. However, Baechler discloses a step of generating the trigger (applying the synchronization trigger signal, col 5 lines 14-15) associated with the wireless transmission (transmission ... via wireless link, col 1 lines 58-59) in anticipation (automatically triggered by means of a timer 37 operating at a preset time interval, col 5 lines 15-16) of the wireless transmission for hearing aids. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to anticipate the wireless transmission by means of a timer. As Baechler teaches that that the step can automatically enable synchronization without using another control unit (col 1 lines 57-65), one would have been motivated to apply the anticipation scheme in Julstrom et al.'s method to generate the trigger.

Claim 31: Julstrom et al. discloses a hearing instrument as in Claim 22; but does not specifically disclose that the trigger signal corresponds to an entire time period associated with the wireless data transmission, as the detector has potential delay in order to sense the carrier. However, Baechler discloses that the trigger signal (synchronization trigger signal, col 5 lines 14-15) corresponds to an entire time period (automatically triggered by means of a timer 37 operating at a preset time interval, col 5 lines 15-16, such that the trigger signal is capable of covering the entire time period) associated with the wireless data transmission (transmission ... via wireless link, col 1 lines 58-59). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to generate a trigger signal corresponding to an entire time period associated with the wireless data transmission. As Baechler teaches

that that the anticipation scheme can automatically enable synchronization without using another control unit (col 1 lines 57-65), one would have been motivated to apply it in Julstrom et al.'s hearing instrument to generate the trigger corresponding to an entire time period associated with the wireless data transmission.

9. Claims 5 and 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Julstrom et al. (2003/0044033) in view of Goodman et al. ("Waveform Substitution Techniques for Recovering Missing Speech Segment in Packet Voice Communications," IEEE Trans. on ASSP, vol.34, No.6, Dec. 1986).

Claim 5: Julstrom et al. disclose a method as in Claim 1; but does not specifically disclose that, when the signal representative of the acoustic-based signal is blocked from the input of the receiver, the receiver does not generate an output acoustic signal. However, Goodman et al. discloses that "zero substitution" (sect I, p 1440) is the simplest reconstruction techniques among various waveform substitution schemes. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to keep the receiver from generating an output acoustic signal when the signal representative of the acoustic-based signal is blocked from the input of the receiver. As Goodman et al. teaches that it is simple and may be acceptable when the probability of loss is low (sect I, p 1440), one would have been motivated to apply "zero substitution" in Julstrom et al.'s method to effectively turn off the receiver.

Claim 9: Julstrom et al. disclose a method as in Claim 6; but does not specifically disclose signal presentation duration. However, Goodman et al. discloses a step of

presenting a signal having a duration of 1 to 50 ms (e.g., packet duration 1 – 32 ms, sect VI-A-(1), p 1444). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to choose the substitute waveform duration within the range. As the speech waveforms displays quasi-stationary intervals within the short-term range (sect II, p 1441), one would have been motivated to set the duration of Julstrom et al.'s substitute waveform to the desired range.

Claim 10: Julstrom et al. disclose a method as in Claim 1; and further discloses a step of controlling a presentation of a signal to the input of the receiver (using control signal 1633 to control the electronic switch 1625 [0078-0079], Fig. 16) when the trigger associated with a data transmission has occurred (if input signal 1627 represents a desired transmission [0079]); but does not specifically disclose the further limitations regarding to the substitute waveform. However, Goodman et al. discloses that the receiver generates one of: no acoustic signal (zero substitution, sect I, p 1440); and a substitute acoustic signal based on a detected acoustic signal that precedes the data transmission (e.g., previous packet, sect I, p 1441). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to generate one of these waveforms for substitution. As Goodman et al. teaches that waveform synthesis is not needed for both approaches (sect I, p 1440), one would have been motivated to apply one of them in Julstrom et al.'s method for waveform substitution.

10. Claims 7-8, 13, 16-18, and 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Julstrom et al. (2003/0044033) in view of Williams (4,965,822).

Claim 7: Julstrom et al. disclose a method as in Claim 6; but does not specifically disclose a predetermined ambient waveform. However, Williams discloses a step of presenting a predetermined ambient waveform (substituting a previously recorded sample of ambient noise, col 12 lines 26-42). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a predetermined ambient waveform as a substitute waveform. As it had been well known in the art that ambient waveform substitution prevents sudden silence gap, one would have been motivated to present a predetermined ambient waveform to the input of Julstrom et al.'s receiver to present a realistic audio environment to the listener when the signal representative of the acoustic-based signal is blocked.

Claim 8: Julstrom et al. disclose a method as in Claim 6; but does not specifically disclose a step of storing data in a computer-readable medium to form a sample waveform. However, Williams discloses steps of sampling the signal representative of the acoustic-based signal (e.g., get input sample from ADC, step 202, Fig. 7A); storing data (e.g., store present input sample, step 246, Fig. 7B) in a computer-readable medium (e.g., computer program ... recording buffer, col 12 lines 10-15) to form a sample waveform; and presenting a signal representative (e.g., replace present sample with ambient noise sample, step 266, Fig. 7B) of the sample waveform to the input of the receiver when the trigger has occurred (if input signal 1627 represents a desired transmission [0079], of Julstrom et al.). Therefore, it would have been obvious to one

having ordinary skill in the art at the time the invention was made to prepare and present a substitute waveform in a computer-readable medium. As the data stored in a computer-readable medium can be accessed repetitively, one would have been motivated to add the steps to Julstrom et al.'s method to store data for later substitution.

Claim 13: Julstrom et al. discloses a hearing instrument as in Claim 12; and further discloses that the means to block the acoustic-based signal includes means to substitute the substitute waveform signal (representative of the signal 1627 from the secondary audio source [0079], Fig. 16) for the processed signal for at least a portion of a period (according to Fig. 19, the output 1981 of the PWM wireless type receiver 1973 [0086] stays active when the transmission is present) when the data receiver receives a data transmission (if input signal 1627 represents a desired transmission [0079], Fig. 16) such that, when the substitute waveform is substituted for the processed signal, the hearing instrument receiver receives and converts the substitute waveform signal into an output acoustic signal (converts the selected signal [0042]); but does not specifically disclose a computer-readable medium. However, Williams discloses a computer-readable medium (e.g., computer program ... recording buffer, col 12 lines 10-15) including data representative of a substitute waveform signal (e.g., substituting a previously recorded sample, col 12 lines 29-35). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to store the substitute waveform in a computer-readable medium. As the data stored in a computer-readable medium can be accessed repetitively, one would have been motivated to add

Williams' computer-readable medium to Julstrom et al.'s hearing instrument to store data for later substitution.

Claim 16-17: Julstrom et al. discloses a hearing instrument as in Claim 15; and further discloses that the switch has a second input (from audio output 1631 of the secondary audio source [0079], Fig. 16), the switch (1625) being configured to selectively connect one of the first input and the second input to the output (select audio output 1631 [0079] or 1637 [0080] as signal 1635), and the controller (transmission detector 1623) is configured to communicate (using control signal 1633) with the switch to selectively connect the second input to the output ([0079]) during at least a portion of the data transmission occurrence (if input signal 1627 represents a desired transmission [0079]); but does not disclose a computer-readable medium. However, Williams discloses a computer-readable medium (e.g., computer program ... recording buffer, col 12 lines 10-15) including data representative of a substitute waveform signal which is a predetermined ambient waveform signal (pre-recorded ambient noise, col 12 lines 26-53) so that a second signal path (second signal 111 in Fig. 1 of Julstrom et al.) is capable of carrying a signal representative of the substitute waveform signal from the computer-readable medium to the second input of the switch. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to arrange a computer-readable medium storing a predetermined ambient waveform signal. As the data stored in a computer-readable medium can be accessed repetitively and ambient waveform substitution prevents sudden silence gap, one would have been motivated to add Williams' computer-readable medium including a predetermined

ambient waveform signal in Julstrom et al.'s hearing instrument for waveform substitution.

Claim 18: Julstrom et al. and Williams disclose a hearing instrument as in Claim 16; but Julstrom et al. does not specifically disclose a sampling module. However, Williams discloses a sampling module (e.g., ADC 92 and ambient noise recorder 112, col 10 lines 30-50, Fig. 2) to sample the output signal (processed transmitted signal Tx' at summing junction 96, col 10 lines 50-55) to form a sample waveform signal stored in computer-readable medium (e.g., computer program ... store ambient noise in the noise recorder 112, col 11 lines 13-42) to function as the substitute waveform signal (e.g., substitute a previously recorded sample, col 12 lines 29-35). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to arrange a sampling module with such functions. As Williams teaches that a sampling module samples the previous output signal which is useful for later waveform substitution (col 12 lines 34-36), one would have been motivated to add Williams' sampling module to Julstrom et al.'s hearing instrument to form a substitute waveform signal.

Claim 23-24: Julstrom et al. discloses a hearing instrument as in Claim 22; and further discloses a waveform signal processing module (receiver 1973 [0086], Fig. 19]) to transform the substitute waveform signal into a processed substitute waveform signal (produce a demodulated signal 1983 [0086]), and that the blocking module (electronic switch 1625, Fig. 16) is configured to selectively pass (select audio output 1631 or 1637 [0079-0080]) one of the processed substitute waveform signal ([0079]) and the

processed acoustic-based signal ([0080]) as the digital output signal (1635), and in response to the trigger signal (detector input signal 1629 that the input signal 1627 represents a desired transmission [0079]), the controller operates to selectively pass the processed substitute waveform (audio output 1631) as the digital output signal (1635) in place of the acoustic-based output signal (1637 [0080]); but does not specifically disclose a waveform memory module. However, Williams discloses a waveform memory module (e.g., recording buffer, col 12 lines 10-15) including data to construct a substitute waveform signal (e.g., a previously recorded sample for substitution, col 12 lines 29-35) which is a predetermined ambient sound (pre-recorded ambient noise, col 12 lines 26-53). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to arrange a waveform memory module including data for a substitute waveform. As the data stored in the memory can be accessed repetitively, one would have been motivated to add Williams' waveform memory module to Julstrom et al.'s hearing instrument to store data for later substitution.

11. Claims 11, 14, 19, and 25-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Julstrom et al. (2003/0044033) in view of Goodman et al. ("Waveform Substitution Techniques for Recovering Missing Speech Segment in Packet Voice Communications," IEEE Trans. on ASSP, vol.34, No.6, Dec. 1986) and Williams (4,965,822).

Claim 11: Julstrom et al. disclose a method as in Claim 1; and further discloses a step of controlling a presentation of a signal (electronic switch 1625 selects audio output

1631 [0079], Fig. 16) to the input of the receiver (speaker 208) when the trigger (detector input signal 1629 that the input signal 1627 represents a desired transmission [0079], Fig. 16) associated with a data transmission has occurred; but does not specifically disclose the further limitations regarding to the substitute waveform. However, Goodman et al. discloses that the receiver generates one of: no acoustic signal (zero substitution, sect I, p 1440); and a substitute acoustic signal based on a detected acoustic signal that precedes the data transmission (e.g., previous packet, sect I, p 1441). Moreover, Williams discloses another substitute acoustic signal corresponding to a predetermined ambient sound (pre-recorded ambient noise, col 12 lines 26-53). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to generate one of these waveforms for substitution. As Goodman et al. teaches that waveform synthesis is not needed for both approaches and Williams' ambient waveform substitution prevents sudden silence gap, one would have been motivated to apply one of them in Julstrom et al.'s method for waveform substitution.

Claim 14: Julstrom et al. and Williams teach a hearing instrument as in Claim 13; and Williams also discloses means to sample (e.g., ADC 92 and noise recorder 112 in Fig. 2, col 10 lines 30-50) the signal representative of the acoustic-based signal before the data transmission and form a corresponding sample waveform signal (as broadly claimed, e.g., previous recorded sample, col 12 lines 29-35); but neither discloses that the resulting acoustic signal is similar to an output acoustic signal generated prior to the data transmission. However, Goodman et al. discloses a substitute acoustic signal

similar to an output acoustic signal generated prior to the data transmission (e.g., because it is likely that the contents of a missing packet will resemble immediately preceding speech, sect I, pp 1440-1441). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use signal prior to the data transmission for substitution. As Goodman et al. teaches that this approach is attractive in that waveform synthesis is not required, one would have been motivated to apply it in Julstrom et al.'s hearing instrument for waveform substitution.

Claim 19: Julstrom et al. and Williams teach a hearing instrument as in Claim 16; and Julstrom et al. further inherently teaches a digital signal processing module (e.g., digital signal processing may be used ([0089]) to receive and process the acoustic-based signal from the microphone system; but neither disclose waveform morphology information. However, Goodman et al. discloses a digital signal processing module (e.g., Digital Signal Processor, sect VII, p 1446) to determine waveform morphology information (e.g., amplitude, sect IV-B, p 1443) about the acoustic-based signal and a waveform signal processing module (can be adapted from Digital Signal Processor, sect VII, p 1446; see also Fig. 3-5 for the approach) to receive the substitute waveform signal from the computer-readable medium (inherently, as previous packets has to be stored, sect IV-A, p 1441), to receive the waveform morphology information from the digital signal processing module, and to adjust morphological parameters (e.g., to adjust the amplitude of the substitution packet, sect IV-B, p 1443) of the substitute waveform signal based on the waveform morphology information. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to

program a signal processing module with waveform morphing functions. As Goodman et al. teaches that using waveform morphology information (e.g., intelligent waveform selection techniques (sect I, p 1441) reduces the impairment, one would have been motivated to add Goodman et al.'s signal processing techniques to Julstrom et al.'s hearing instrument for better waveform substitution.

Claim 25: Julstrom et al. and Williams teach a hearing instrument as in Claim 23; and Williams also discloses a sample module (e.g., ADC 92 and noise recorder 112 in Fig. 2, col 10 lines 30-50); but neither discloses using preceding digital output signal as the substitute waveform signal. However, Goodman et al. discloses a sample module (inherently for DSP, sect VII, p 1446) to sample a preceding digital output signal corresponding to a preceding processed acoustic-based output signal (e.g., previous packet, sect I, p 1441), and to store a sample waveform (inherently, there has to be a buffer to store the previous packet) corresponding to the preceding digital output signal as data in the waveform memory module for use as the substitute waveform signal. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use preceding signal for substitution. As Goodman et al. teaches that it is likely that the contents of a missing speech (packet) will resemble immediately preceding speech (sect I, pp 1440-1441), one would have been motivated to sample and store a preceding digital output signal of Julstrom et al.'s hearing instrument for later waveform substitution.

Claim 26-30: Julstrom et al. and Williams teach a hearing instrument as in Claim 23; but neither discloses waveform morphology information. However, Goodman et al.

discloses that the waveform signal processing module (e.g., waveform substitution schemes, sect II, p 1441, implemented by DSP, sect VII, p 1446) is configured to receive morphology information (e.g., amplitude, sect IV-B, p 1443) corresponding to a previous acoustic-based signal (e.g., previous packet, sect I, p 1441), and to adjust morphological parameters (e.g., to adjust the amplitude of the substitution packet, sect IV-B, p 1443) of the substitute waveform signal to form the processed waveform; wherein the morphological parameters that are capable of being adjusted by the waveform signal processing module, includes: phase (e.g., time position, sect V p 1443), frequency (e.g., pitch, sect V p 1443) and amplitude (sect IV-B, p 1443); wherein the waveform signal processing module, includes a module to adjust a length (e.g., packet size, sect VI-A-(1), p 1444) of the substitute waveform signal having a duration of 1-50 ms (e.g., 1 – 32 ms, sect VI-A-(1), p 1444) and a module to smooth ends of the substitute waveform (Two-Side Approach: the final replacement packet is a weighted sum of past and future selections, sect IV-C p 1443) to connect a first end of the substitute waveform to a preceding acoustic-based waveform (past selection) and to connect a second end of the substitute waveform to a succeeding acoustic-based waveform (future selection). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to program a waveform signal processing module with morphological functions. As Goodman et al. teaches that using waveform morphology information (e.g., intelligent waveform selection techniques (sect I, p 1441) reduces the impairment, one would have been motivated to add Goodman et

al.'s signal processing techniques to Julstrom et al.'s hearing instrument for better waveform substitution.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Anderson (5,721,783) discloses a hearing aid with wireless remote processor; Jones et al. (2003/0138116) disclose some interference suppression techniques using sample waveform storage; Sasaki et al. (5,539,858) discloses a voice coding communication system and apparatus with comfort noise generation; Ach-Kowalewski (6,044,164) discloses a hearing aid permitting simultaneous programming and adjustment with a single plug and a memory module; and Blumenau (6,839,446) discloses a hearing aid with sound replay capability.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Powen Ru whose telephone number is 571-270-1050. The examiner can normally be reached on Monday-Thursday 7:30am-3:30pm EST/EDT.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on 571-272-7654. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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